

REMARKS

After the foregoing Amendment, claims 1-14 and 16-20 are currently pending in this application. Claim 15 is canceled without prejudice. Claims 1, 3-6, 8-10, and 13 are amended without prejudice. Applicant believes that the amendments are supported by the originally filed specification and no new matter has been introduced into the application by these amendments.

Claim Rejections - 35 USC §103

The Action rejects claims 1-20 as obvious over U.S. patent No. 3,574,591 (Lyons). Applicant respectfully disagrees and traverses the rejection for at least the following reasons.

Claim 15 is cancelled and its rejection is moot.

Claim 1, as amended, recites:

A process for the preparation of water insoluble, bio-release iron-manganese polyphosphate fertilizer, the process consisting of

a) heating phosphoric acid at a temperature of at least 160°C with a mixture of (i) a source of iron oxide including one or more substance selected from the group consisting of goethite and hematite, (ii) pyrolusite and (iii) one or more basic compound selected from the group consisting of magnesium oxide(s), magnesium carbonate, calcium oxide, sodium oxide, potassium oxide, calcium carbonate, sodium carbonate, and potassium carbonate for a time period ranging from 20 minutes to 2 hours, to produce a liquid polyphosphate;

b) neutralizing of the liquid polyphosphate, wherein the neutralized liquid is characterized by solubility in 0.33M citric acid and 0.005M DTPA;

- c) drying the neutralized material to obtain a solid; and
- d) pulverizing the solid.

In contrast, Lyons teaches mixed cation polyphosphate compositions, which are slowly soluble in water, and which contain substantial percentages of ammonium as cations, potassium and other metallic cations. The process taught by Lyons produces a potassium-ammonium polyphosphate composition where nitrogen is an essential component in the polymerization step. It requires a combined ammoniating and condensing agent. **In contrast, as recited in claim 1, as amended, there is no nitrogen compound in the polymerization stage.**

Lyons claim 2 recites the combined ammoniating and condensing agent includes at least one amide. This is an essential feature of the process. **According to the present invention there is no use of any condensing agent and ammonia is added only for neutralization.**

Lyons teaches at column 4 that the reaction therein can be conducted at temperature can be 180°C to 240°C for 1 – 24 hours; and at column 5 that the temperature range can be 170°C to 260°C for 20 - 26 hour. As stated in Lyons, however, temperatures at 180°C or lower result in the need for time periods between 30 – 36 hours. Lyons, column 4, lines 65 – 71. In contrast, claim 1, as amended, recites “a temperature of at least 160°C” ... “for a time period ranging

from 20 minutes to 2 hours... ." According to the process recited, at temperatures at 160°C, the time period for the reaction would be about 20 minutes to about 2 hours at the high end. Since Lyons teaches a much greater time period at low temperatures, Lyons teaches away from conducting the reaction at "a temperature of at least 160°C" ... "for a time period ranging from 20 minutes to 2 hours..." as recited in claim 1, as amended.

Taken as a whole, the chemical reaction taught in Lyons teaches away from the claimed process because the process is entirely different from the claimed invention; *e.g.*, the reactants are different. Lyons requires a combined ammoniating and condensing agent and in its preferred embodiment, Lyons is polymerizing a ammonium-potassium-urea-phosphate. In Applicant's preferred embodiment, the process recited in claim 1 is for polymerizing an iron-manganese phosphate. Applicant respectfully disagrees that the process taught in Lyons is even directed to the same kind of fertilizer.

Applicant submits that an ammonium phosphate reaction is different from iron phosphate reaction. Iron phosphate polymerises at a lower temperature. Also the process recited in claim 1 does not result in full polymerization because the reaction is stopped midway; when it is still liquid. The time and temperature of reaction are very reduced in comparison to Lyons because solidification is not done by heating to complete polymerisation. As claimed, a short heating is done followed

by neutralisation. This reduces energy requirements and eliminates the need for a condensing agent (urea / amides). Because of the reaction times, even the slight overlap in temperature range between Lyons and the recited process does not render the claimed invention obvious.

By eliminating urea or amides and potash salts as essential components, there is greater flexibility in the raw materials, the product will be more cost effective and will have an increased micronutrient (Fe-Mn) content of the product vis-a-vis the potassium-ammonium polyphosphate produced by Lyons.

It is not clear how much Fe or Mn the process of Lyons could load in the product but it is seen from the single Example that the Cu content of the fertilizer is only 2.9%. In addition, according to Claim 8 (of Lyons) the maximum 'multivalent metal cation source' (ie. Fe, Mn, Cu and Zn) is 5%. (the present product has total micronutrient of about 5.5% Fe + 2.7% Mn i.e. 8.2 % of metal cations. Reducing raw materials and increasing percentages of critical elements are significant features which are neither taught nor motivated by the prior art. Applicant submits that there is no motivation for such a reduction of raw materials.

By teaching an ammoniating and condensing agent, e.g. urea, Lyons teaches away from the claimed process, which does not include an ammoniating and condensing agent in step a.

Based on the foregoing, Applicant believes that claims 1 – 14 and 16 – 20, as

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amended, are non-obvious over Lyons and that the rejection is overcome. Applicant requests withdrawal of the 35 U.S.C. § 103(a) rejection of claims 1 – 14 and 16 – 20.

Claim Rejections - 35 USC §112, first paragraph

The Action rejects claim 9 for reciting alleged new matter. Obviating amendments are made and Applicant requests withdrawal of the 35 U.S.C. § 112, first paragraph rejection.

Claim Rejections - 35 USC §112, second paragraph

The Action rejects claims 1 – 20 as indefinite based on language highlighted in claims 1, 9, and 15. Obviating amendments are made and Applicant requests withdrawal of the 35 U.S.C. § 112, second paragraph rejection.

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Conclusion

If the Examiner believes that any additional matters need to be addressed in order to place this application in condition for allowance, or that a telephone interview will help to advance the prosecution of this application, the Examiner is invited to contact the undersigned by telephone at the Examiner's convenience.

In view of the foregoing amendment and remarks, Applicant respectfully submits that the present application, including claims 1-14 and 16-20, is in condition for allowance and a notice to that effect is respectfully requested.

Respectfully submitted,

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